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PELLAGRA

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While a comparatively new disease in the United States, pellagra has been known and studied in Europe for nearly two centuries. The credit for its first description is almost universally ascribed to Gaspar Casal, a Spanish physician, who first observed the malady in the Province of the Asturias, in Northern Spain, early in the eighteenth century. It was called by Casal *mal de la rosa,* or the rose disease. About twenty years later the disease was noticed and described in Northern Italy. It was given various names until Frapolli of Milan, in 1771, first applied to it the name "pelagra." In the early part of the nineteenth century the same affection was reported from France, and later from Roumania, Egypt, and other places in Southern Europe.

The United States, apparently, for many years remained singularly free from this malady. Sporadic cases are found in the literature as early as 1864, but the reports are very meagre. In the latter part of 1906 and early 1907, succeeding a report by Searcy of an epidemic in the Mount Vernon (Alabama) Asylum for Negroes, the disease was reported by a number of observers, and independently identified by both Babcock and Watson as identical with the Italian disease. The malady was then rapidly recognized as rather extensively present in several of the Southern States, and occurred also in Illinois and in some other states.

The apparently sudden appearance and undue prevalence in America of so striking a disease are worthy of note. Similar occurrences, however, have been recorded in the history of other striking diseases, and the history of the advance of pellagra in Southern Europe early in the eighteenth century bears a marked similarity to what has occurred in the United States. While we now know that pellagra has undoubtedly occurred, at least sporadically, in the United States for many years, it is hardly credible that it could have been overlooked had it shown anything like the prevalence of the last five or six years.

In almost every place where it has appeared, pellagra has proven a serious menace to the health and well-being of certain classes of the population, and it is no exaggeration to say that it has been, and still is, a veritable scourge in certain parts of Southern Europe. It seems not unlikely that parts, at least, of the United States may have a similar experience.

The disease at the present time is most prevalent in parts of Italy, Austria, Roumania, Egypt, and the United States, though it is also found in many other places as well. According to official statistics, pellagra reached its high tide in Italy in 1881, when there occurred nearly 105,000 cases in the entire kingdom. Since then there has been a steady decrease, and at present there are reported less than 50,000 cases. Up to recent years Italy also reported from 2500 to 4000 deaths annually from the disease, but this number is now, of course, greatly decreased. Certain parts of Austria and Roumania can show equally distressing conditions.

While accurate and extensive data are lacking in the United States, yet from a recent inquiry made by myself, under the direction of the Surgeon-General of the Public Health Service, it may be safely asserted that from 1907 to 1911, both inclusive, there have occurred in the United States at least 30,000 cases of the disease, with a case fatality rate approximating 40 per cent. And it is to be remembered that pellagra was a negligible quantity in the medical annals of this country up to about the beginning of 1907. The area of its greatest prevalence in the United States lies in the Southeastern States; roughly speaking, those states which lie south of the Potomac and Ohio and east of the Mississippi rivers, with Louisiana, Texas and Arkansas included. A reference to the map will show the general distribution of the disease in the United States. The malady has rapidly increased and extended its territory, and so far as can be judged in the absence of statistics, this increase and extension continue. The chart shows the rapidity of its increase as based on reports from eight of the worst affected states. While pellagra numerically cannot be compared with such a disease as typhoid fever in this country, yet in the face of such figures as those above quoted, the gravity of the situation admits no denial.

Etiology.—The cause of pellagra is obscure, but the disease nevertheless has almost unanimously been regarded as a food poisoning, allied to ergotism, and attributed to the use of Indian corn or maize as an article of diet. The corn theory originated almost with the discovery of the disease, and from that time until now it has held a dominant place in the consideration of its etiology.

It has long been customary to divide in a general way the theories regarding the cause of pellagra into two schools, the advocates of the corn theory being called zeists (from *Zea Mays*) and the opposition antizeists. These two words serve often a useful purpose, but are likely to lead readers astray. It is not to be understood from them that there are only two theories of the cause of pellagra. On the contrary, there are scores of theories. The zeists agree in one thing only and that is that either directly or indirectly pellagra is etiologically related to maize; while the antizeists agree in one thing only, and that is that the disease bears no such relation to maize. The zeists, however, do not agree among themselves nor do the antizeists show any more harmony in their views. Without going into the details of the various theories and shades of opinion, it may be said that the great struggle now centres around the question: Is pellagra a kind of food poisoning from maize or is it due to some parasite infecting the human body?

The most prevalent zeist idea is that pellagra is a chronic intoxication "produced by poisons developed in spoiled corn through the action of certain micro-organisms, in themselves harmless to man." This conception of course includes some consideration of spoiled corn. It has been shown that to speak of spoiled corn is not to be very definite, since in the spoiling of corn there occur complex and not always uniform chemical changes. Corn is a poorly protected grain and readily undergoes deterioration. In this state it furnishes a good culture medium for both bacteria and moulds, with the production by them of toxic substances. It can be shown that these toxic substances produce changes in animals, but as yet no one has been able to produce with them anything which can be considered as comparable to pellagra in man. Among other important zeist theories, the most popular, perhaps, is the idea that the disease is an autointoxication of some kind connected with the metabolism of corn or corn products in the human organism. Then there are still some who think that pellagra is due to a specific micro-organism ingested with spoiled corn. In addition, there is an idea that pellagra is a photodynamic disease, and that corn possesses some soluble toxic product which, circulating in the blood stream, is harmless until sensitized by the chemical rays of the sunlight.

Without going into further details, we may turn now to the antizeists. Exclusive of the view that pellagra is not a morbid entity, but is only a symptom complex, the most important development in antizeistic thought is the theory of Sambon. According to this author, pellagra is an infectious disease, caused perhaps by some protozoal parasite transmitted through the agency of a blood-sucking insect. The parasite is hypothetical but the transmitting agent, according to Sambon, is some one or more species of *simulium* or buffalo gnat. In conformity with the life history of this insect, pellagra, according to this view, must be closely linked to the running stream since this insect breeds only in such streams. This theory, as well as other antizeistic theories, at present cannot be said to rest on secure scientific foundations.

From a careful view of the entire subject it is probably safe to assert that in any definite, scientific sense the cause of pellagra is unknown. The supposed relation of the disease to corn can, however, neither be lightly cast aside nor held with dogmatic adherence.

It may be added here that certain predisposing etiological factors are of importance. It is noticeable in Italy that the disease is almost exclusively confined to the field laborer. This is, however, not so marked in America. Previous illness, depressing conditions and unsanitary surroundings, with poor food, also predispose to the disease. Climatic and seasonal conditions are likewise of importance, as will appear later.

The contagiousness of pellagra may be mentioned at this point. This has very naturally been a matter of much concern. So long as the etiology of the disease is unknown, it is of course impossible to make positive statements, but those who have had longest experience do not regard the disease as transmissible from one person to another. In Italy no precautions of quarantine or isolation are practised, and the sick associate intimately with the well. Doctors, nurses, and others in attendance on the sick do not contract the disease. In the present state of our knowledge, measures of quarantine or isolation do not seem to the writer wise or necessary. They serve only to increase an already wide-spread pellagraphobia.

If communicable at all, pellagra certainly does not seem to be so in any very direct way from one individual to another. Evidence is not lacking that pellagra is possibly a disease of place or locality, somewhat after the apparent nature of beriberi. This, however, does not necessarily imply anything as to its transmissibility.

Symptomatology and Diagnosis.—Pellagra appears to be a chronic intoxication, and is characterized clinically by a chronic course with the periodic manifestations of acute symptoms referable to the gastrointestinal tract and the nervous system, as well as by the appearance of an erythema on exposed body surfaces. It not infrequently leads to insanity or to a fatal cachexia.

The disease is very variable in its manifestations, but is consistent in its development and is a distinct morbid entity. For purposes of description it has long been customary to divide its symptomatology into stages or periods. The simplest of these divisions is prodromal, first, second, and third stages. These divisions, however, are to a large extent arbitrary. There is no sharp line of demarcation between the stages, nothing is implied as to the length of time, and the stages represent rather differences in degree than in kind. The disease is essentially chronic, but acute conditions, as will be mentioned later, are also described. Pellagra runs its course in a series of periodic attacks—alternating ameliorations and exacerbations. The exacerbations occur usually in the spring, sometimes in the fall, occasionally at other seasons, and subside after a time only to recur again the next year. The brunt of the successive attacks is largely borne by the nervous system, and each annual recurrence leaves a deeper impression upon the nervous and mental condition of the patient.

The *prodromal* stage is indefinite both in length of time and symptomatology. Fleeting pains, paræsthesias, neurasthenic phenomena, mild gastro-intestinal disturbances, vertigo, progressive muscular weakness, loss of appetite, and general malaise may all be seen at this time. Pronounced symptoms usually appear in the spring or fall.

The *first stage* usually concerns the gastro-intestinal disturbances and the erythema. Changes in the appetite, burning in the mouth and stomach, and ptyalism are often noticed. The tongue is usually coated, with red tip and edges, the papillæ frequently prominent and injected, sometimes it is smooth and red, and again marked by fissures. There is present also, frequently, a marked stomatitis. Dyspepsia, flatulency, abdominal pains, and occasional vomiting are also seen. Diarrhœa is very frequent and at times is dysenteric in character. Muscular weakness, especially of the lower extremities, is often evident. The temperature is usually normal. Vertigo, headache, insomnia, various neuralgias and cramp-like pains in the extremities are described. The knee-jerks are usually exaggerated. Intelligence, even at this period, is often affected; the neurasthenic manifestations are frequent and important. Along with these symptoms the characteristic erythema appears. This pathognomonic symptom will be described later.

The *second stage* is marked by an aggravation of existing symptoms and the appearance of new and marked evidences of involvement of the nervous system, which now dominate the scene. Among the motor disturbances muscular weakness, partial paralyses, tonic contractions, tremors of the arms, head and tongue, convulsive movements, and exceptionally epileptiform seizures may be noticed. The gait may be paralytic or paralytic-spastic. Among sensory disturbances paresthesias of great diversity are noted. Sensations of burning, formication, hot and cold flushes, numbness, dragging, etc., all render the patient's existence miserable, and sometimes even end in suicide. Changes may occur in some of the organs of special sense. Vasomotor and trophic changes are also seen. Psychic disorders, usually of a depressed nature, and in some cases actual insanity, are not unusual. Among general symptoms it may be noted that fever in uncomplicated cases is slight. Disturbances of the menstrual function and other disorders of the reproductive system are not infrequent. There is usually a mild grade of anæmia.

The *third stage* is really the terminal stage and is chiefly characterized by cachexia. There is an increasing marasmus which, along with the other symptoms described, finally leads to the fatal issue, death not infrequently being due to some intercurrent affection.

Pellagra in its chronic course not infrequently displays certain very acute and rapidly fatal explosions—fulminant attacks which are of the utmost gravity, and not always easy of diagnosis if the patient has not been seen before the onset of the acute condition. The most typical of these explosive incidents has been called by the unfortunate name of typhoid pellagra. And there occur other allied acute conditions. These conditions may prove extremely puzzling unless one have pellagra in mind and make careful inquiry into the history of the case and scrutinize the skin for the evidence of a past erythema.

Further it may be mentioned here that the psychic manifestations of pellagra are common and important. Besides the milder manifestations already noted it is well recognized that pellagra may be the cause of insanity. It is thought that from 8 to 10 per cent. of pellagrins develop serious mental disorder, the type of which is variable. It should always be remembered that pellagrins with mental disorder, even of a mild grade, often show suicidal tendencies.

Pellagrous Erythema.—The pathognomonic symptom of pellagra is the erythema. Largely following Merk, the characteristics of this erythema are given below.

1. Dermatologists have almost unanimously agreed, in the first place, that the pellagrous eruption is an erythema in the dermatologic sense of that word.

2. The erythema, as a rule, appears suddenly—within a short time; and its genesis is not necessarily connected with such external things as solar or atmospheric influences. Not infrequently, however, its origin can be traced to various external influences, solar influences,

applications of various irritating substances or even pressure, as, for example, on elbows and knees, which should always be examined.

3. The erythema is peculiar and characteristic in its limitation, its edge ending in a typically marked red border, delimiting it sharply from the healthy skin beyond.

4. In its evolution it rather early develops a broad zone of scaling which is quite characteristic of the process. As a rule it does not reach its height for several days, and requires even a longer time in its retrogression, which ultimately occurs by first, loss of the rosy border, then gradual fading of the centre, while the scaling and crusting zone remains still longer the seat of the receding process. Exfoliation may take place with the shedding of the large areas of epidermis.

It is to be noted that some cases show bullous formation with early loss of epidermis, and consequent raw, bleeding surfaces which readily become infected. At times during the receding process ulcers and painful cracks and fissures may develop, and even gangrenous processes may be rarely seen.

5. One of the most striking characteristics of the eruption is its symmetry and distribution. It is nearly always markedly symmetrical and shows certain places of predilection. These are the backs of the hands, and of the feet, the face and the neck—those places most exposed to atmospheric influences. Many descriptive appellations have been given to the various localizations of the erythema, such as "glove," "gauntlet," "boot," "neckband," "cravat," "mask," etc. In addition to these favorite spots the eruption may exist elsewhere and may even be generalized.

6. The color scheme of the erythema is of importance. On its first appearance it is usually a fairly bright red, almost like a sunburn, and the part is a little puffy. In a short time this color often takes on a bluish tint, sometimes called "plum" color. Then, in the course of further changes, the whole passes to a reddish brown, or sepia, or bronze tint, which is very characteristic.

7. Itching is usually absent and never marked. The part burns and has a tense, uncomfortable feeling, but does not show scratch marks.

8. The seasonal appearance of the eruption is important. As a rule, it appears but once annually, at spring time or in the fall. It may occur at both seasons in the same individual, but this is unusual. It may also occur rarely in the winter months.

9. With early attacks the skin, after the disappearance of the

eruption, resumes its normal appearance, but recurrences lead finally to trophic changes.

10. Notwithstanding the importance of the skin symptoms in diagnosis, the associated constitutional manifestations should be sought for and given due weight. Cases may occur with only the skin eruption, and in some localities such cases, especially in children, are not rare.

Reference here must be made to the fact that pellagra is reported without any skin lesions, so called *pellagra sine pellagra.* It is a matter of much doubt whether a pellagra ever occurs without skin symptoms at some period of its evolution. It is no rare thing, however, to meet cases presenting the clinical features of the disease without skin manifestations. The diagnosis under such circumstances is by no means certain, and in many cases must remain tentative.

Treatment.—The treatment includes prophylaxis and the management of the developed disease.

Prophylaxis: In view of the uncertain etiology there are few definite prophylactic measures which may be recommended. Until something more definite is learned it would certainly be wiser to avoid corn and corn products, more especially since there is good reason to believe that many of the corn preparations found in the market are likely to be spoiled. This is probably more particularly true in the southern states. The Italian Government has adopted prophylactic measures based entirely on the corn theory and is claiming good results therefrom.

Management of the disease: The treatment of the disease, since there is no specific remedy, is not satisfactory and is largely symptomatic. The essential points in treatment are outlined below.

General measures: Where obtainable, good nursing will contribute largely towards success. Rest is a matter of prime importance and should never be neglected, even in mild cases. Diet is a matter of almost equal importance. It should be abundant, carefully selected, easily assimilable, and, whenever possible, should include meats. It must of course be regulated to meet the needs of the individual case, but abundance of food should be insisted upon. It should include a liberal supply of salt. The patient should be weighed regularly. Various hydrotherapeutic measures may often be used with benefit. Such treatment must, however, be used with discretion, and consideration given to the state of the patient and the result to be obtained. Change of climate, especially to colder latitudes, may be advised. Avoidance of strong direct sunlight will often prevent a bad erythema. Fresh air, and cleanliness are of course to be enjoined. Saline solution by the bowel or intravenously may at times be of service.

Medicinal: Arsenic has long enjoyed a reputation in the treatment of pellagra. It may be advantageously used in the form of Fowler's or Donovan's solutions. Atoxyl and soamin, as well as salvarsan, may be of service in selected cases. Hexamethylenamine, quinine, and thyroid preparations all have their advocates. Symptomatic remedies must be employed as needed. For insomnia some of the well-tried hypnotics; for the diarrhœa bismuth preparations, guaiacol carbonate, and opium; for the anæmia some bland preparation of iron; for the erythema a calamine lotion, bland ointment, or, if necessary, antiseptic dressings. Strychnine is of value in convalescence. Complications should be promptly treated with appropriate remedies.

Surgical: Under some circumstances direct transfusion of blood may prove a valuable surgical resource.

In conclusion, the mental depression so often associated with pellagra sometimes results in suicide, and this should always be kept in mind. It is not to be forgotten also that a disease so chronic in its nature and so prone to relapses demands prolonged medical supervision.

THE TRAINED TEACHER IN THE TRAINING SCHOOL *

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THE arguments in favor of the trained *versus* the untrained teacher seem to me so self-evident as to be almost a reflection on the intelligence of the audience to which they are presented. At the same time, I know that many superintendents of training schools are not yet convinced that trained teachers who bring modern methods of teaching into the schools have any particular advantage over the old order.

Matthew Arnold has said in one of his essays, "Nothing is taught well except what is known familiarly and taught often," and again, "Once secure what is excellent to be taught, and you can hardly teach it with too much insistence. . . . But the heart-breaking thing is, that

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* Read at the April meeting of the New York State League for Nursing Education.